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# **National Oceanic and Atmospheric Administration**

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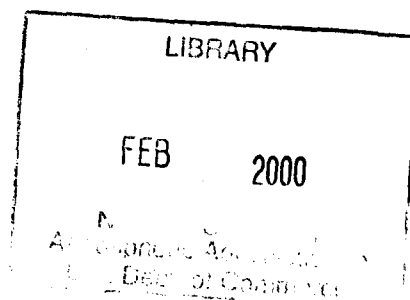
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# INDIA WEATHER REVIEW, 1962

## ANNUAL SUMMARY

### PART-C



## STORMS & DEPRESSIONS

### I. DEPRESSIONS AND CYCLONIC STORMS

During the year, 5 cyclonic storms and 6 depressions formed in the Bay of Bengal. Out of these, one cyclonic storm and a depression moved across the country and emerged into the Arabian Sea as depressions. In addition to the above two more depressions formed in the Arabian Sea. The tracks of the storms and depressions are given in Plates 1 and 2. The dates of the storms, and the greatest barometric depths observed (or estimated) near their centres are summarised in the following table.

Table I

Locality	Month	Date	Greatest Observed Barometric depths (mb).
Bay of Bengal	May	15th-16th	10 (estimated)
"	September	20th-24th	12 (estimated)
"	October	26th-30th	16 (estimated)
"	November	26th-29th	34 (estimated)
"	December	9th-13th	19 (estimated)

The monthly distribution of the storms and depressions for the year 1962 is given in Table II at the end. A detailed description of these storms and depressions is provided below.

#### 1 Cyclonic Storm in the Bay of Bengal and Depression in the Arabian Sea— —15th to 22nd May 1962—

On the morning of 12th May 1962 a low pressure area developed over the southwest Bay of Bengal and the adjoining areas of Tamil Nadu and Sri Lanka. The associated upper air cyclonic circulation extended upto 3.6 km. On 13th morning the upper air cyclonic circulation became more marked, and extended to 6 km. There was fairly widespread thunderstorm activity over south Tamil Nadu and Sri Lanka. Mannar recorded 10 cm of rain on the 13th. By the 14th morning the low pressure area over southwest Bay became well marked with its central region near 11°N, 82°E. By the next morning, the strengthening of upper winds over east Tamil Nadu suggested that the well marked low pressure area over the southwest Bay had concentrated

into a depression. This was centred at 0830 hrs IST of 15th near 11.5°N, 82°E. ship S.S.Caltex Pernis (11.4°N, 80.9°E) reported at 0530 hrs IST of the 15th north westerly winds of 15 kt, and heavy intermittent rain. At 1130 hrs IST of the same day the same ship, when it was at 11.8°N, 80.6°E reported northerly winds of 30 kt indicating that, by then, the depression had intensified into a deep depression. By the same evening, it intensified further into a cyclonic storm and was centred at 1730 hrs IST near 12.5°N, 81.5°E. The following observations of the 15th are relevant in this connection:

Name of the Ship/Station	Position	Hour of Obsn. IST	Wind	Weather
S.S.Mazdana	13.6N, 80.7E	1730	030/22 kt	Moderate cont.drizzle
S.S.Cara Sea	12.6N, 80.5E	1730	360/40 kt	Heavy cont. rain,
S.S.Jalamani	11.2N, 83.8E	1730	140/09 kt	
S.S.Bharatrani	15.5N, 82.9E	1730	140/13 kt	
Madras		1730	360/20 kt	Slight cont. rain

The associated cyclonic circulation was strong and extended upto 9 km. The central pressure inferred was 994 mb which was about 10 mb below normal.

Then the cyclonic storm took a southwesterly course, crossed the Coromandal coast near Cuddalore in the early hours of the 16th, and weakened into depression centred at 0830 hrs IST of 16th between Cuddalore and Kallakurichi. The associated upper air cyclonic circulation, however, extended upto 10.5 km. The depression moved westsouthwestwards and was centred near Salem at 1730 hrs IST of 16th, and near Palghat at 0830 hrs IST of 17th. Thereafter, moving slowly northwestward the depression emerged into the southeast Arabian Sea off the Malabar-south Kanara coasts on the 18th morning with its centre at 0830 hrs IST close to the coast near 12.5°N. Continuing to move in a northwesterly course, it was centred near 14.5°N, 73.5°E at 1730 hrs IST of 20th as indicated by the following ships observations on the 20th.

Name of ship	Position	Hour of Obsn.(IST)	Wind
S.S.Mustali	14.8N, 73.2E	1730	040/09 kt
S.S.Jalapushpa	14.0N, 74.3E	1730	180/24 kt

Thereafter, the depression moved rapidly westnorthwestwards and lay near 15.5°N, 69.5°E at 0830 hrs IST of 21st, near 17.5°N, 65.0°E at 0830 hrs IST of 22nd and near 18°N, 63°E at 1730 hrs IST of 22nd. It weakened and lay as a low pressure area over the west central Arabian Sea by the next morning. The low pressure area remained practically stationary and became unimportant by the evening of the 24th.

Under the influence of this disturbance, the southwest monsoon advanced into the Comorin-Maldives areas and Sri Lanka on the 15th May, into south Kerala on 17th and into north Kerala and coastal Mysore by the 19th. A number of heavy to very heavy falls were recorded in Tamil Nadu, Kerala and coastal Mysore in association with the depression. The chief amounts of rainfall reported were:

Date	Station	Rainfall (cm)
14	Alleppey	10
17	Ootacamund	14
	Alleppey	11
18	Honavar	13
	Mangalore	10
	Fort Cochin	9
19	Calicut	11
	Mangalore	9

**2 Deep depression in the Bay of Bengal—  
—24th to 25th May 1962—**

On the morning of 22nd May 1962 the backing of upper winds in the lower levels over Deltaic Burma, and widespread rain with scattered heavy falls over the Andamans, suggested that a cyclonic circulation from the east was moving into the North Andaman Sea. Under its influence a low pressure area formed by the morning of 23rd May over north Andaman Sea and the adjoining areas of east central Bay. The associated upper air cyclonic circulation extended to 4.5 km. There was also strengthening of upper winds over the north Bay Islands and Deltaic Burma.

On the morning of 24th, negative pressure departures of the order of 4-6 mb over the Bay Islands, the Arakan coast and a well marked upper air cyclonic circulation over the Bay extending upto 7 km, suggested that the low pressure area had concentrated into a depression over the east central Bay with centre at 0830 hrs IST of 24th near 17°N, 92°E. In this connection the following observations of 24th are significant:

Name of the Ship/Station	Position	Hour of Obsn.(IST)	Wind	Weather
S.S.Alsayyala	18.4N, 92.9E	0530	SSE/15kt	Precipitation within sight
Coco Island		0830	SSW/15kt	
Bassein		0830	SE/5kt	Drizzle in last hour
Akyab		0830	ENE/5kt	Slight intermittent drizzle

The depression moved northnorthwestwards and intensified into a deep depression by the morning of 25th centred at 0830 IST near 19.5°N, 92.5°E. The estimated central pressure was about 992 mb, about 14 mb below normal. In the course of the day the deep depression moved northnortheast, crossed the Arakan coast near Akyab, weakened rapidly and lay at 1730 hrs IST of 25th as a low pressure area over central Burma. The low pressure system became unimportant by the next day.

In its wake the southwest monsoon temporarily advanced into the north B of Bengal on 25th and extended by the 27th into Assam, where heavy to very heavy rainfall occurred. The principal amounts of rainfall reported were:

Date	Station	Rainfall (cm)
24	Port Blair	6
25	Kondul	9
	Car Nicobar	9
	Nancowrie	7
26	Sandeway	16

### 3 Depression in the Arabian Sea

—28th to 30th May 1962—

A trough of low pressure was lying over the west central and the adjoining areas of east central Arabian Sea on the 25th and 26th May 1962. On the morning of 27th May a low pressure area developed over the central Arabian Sea. In this connection the following ships' observations of 27th are relevant:

Name of the Ship	Position	Time of Obsn. (IST)	Wind	Weather
S.S.Mohamadi	18.0N, 63.2E	1130	NE/10 kt	
S.S.Sevenia	18.3N, 66.5E	1130	E/10 kt	
S.S.Jalarajendra	17.5N, 67.2E	1130	SSW/10 kt	

By the morning of 28th the low pressure area over the central Arabian Sea concentrated into a depression which was centred at 0830 hrs IST near 16.5°N, 64.1°E. In this connection the following observations of 28th are of interest:

Name of the Ship	Position	Time of Obsn. (IST)	Wind	Weather
S.S.Jalarajendra	16.9N, 63.7E	0530	N/10 kt	Moderate intermittent rain
S.S.Maril Karla	19.3N, 66.7E	1130	ESE/10 kt	Showers
S.S.Mohammedi	18.5N, 68.5E	1130	SE/15 kt	
S.S.Bridges-torn Maru	16.2N, 69.5E	0530	S/20 kt	

The depression moved westnorthwestwards and lay over the west central Arabian Sea on the morning of 29th centred at 0830 IST near 18.5°N, 60.0°E. Continuing to move in a westnorthwesterly course, the depression was centred close to Kuria Muria coast near 19°N, 58.5°E at 0830 hrs IST of 30th. S.S.Caltex Naples. (19.5°N, 58.6°E)

reported at 1130 IST of 30th, Easterly 25 kt. The depression crossed the coast near 19°N, during the course of the day, rapidly weakened and lay as a low pressure area over Saudi Arabia at 1730 IST of 30th.

In association with the development of the depression, the southwest monsoon advanced into the coastal Mysore and extended into Konkan by 20th May. Some of the noteworthy amounts of rainfall recorded were:

Date	Station	Rainfall (cm)
25	Mangalore	15
26	Karwar	18
	Honavar	13
28	Devgad	16
	Vengurla	11

#### 4 Depression in the Bay of Bengal— —6th to 8th June 1962—

An upper air cyclonic circulation in the lower troposphere was lying over North Andaman Sea and adjoining South Burma on the morning of 2nd June. Moving slowly westwards it developed into a well marked cyclonic circulation extending to 6.0 km a.s.l. by the morning of 4th when it lay over the east central Bay and the adjoining northeast Bay of Bengal. Associated with this development, there was fairly widespread and moderate rain and pressure deficiency of 3-4 mb over the Chittagong - Arakan coasts on the morning of 4th. During the next 24 hours there was strengthening of upper winds over the Arakan coast and also at Port Blair and the rise of pressure over Burma and East Pakistan indicated that the system had moved further westnorthwestwards. Under its influence a well marked low pressure area formed over the north and the adjoining central Bay on the morning of 5th. The upper level cyclonic circulation over these areas extended to 7 km a.s.l. By 6th morning, the well marked low pressure area over the north and adjoining central Bay concentrated into a depression centred at 0830 IST near 19.0°N, 88.0°E. It moved in a northerly direction and lay over northwest Bay at 1730 IST of 6th with its centre near 20.5°N, 88.0°E. Moving in a northerly direction the depression was centred close to the Sunderbans coast near 21.5°N, 88.0°E at 0830 IST of 7th.

The depression crossed the Sunderbans coast during the forenoon of 7th near Sagar Island and lay centred near Khulna at 0830 IST of 8th. It weakened into a low pressure area the same evening over Assam and became unimportant by 11th.

In association with the depression the southwest monsoon established itself over the whole of the Bay of Bengal and advanced into Gangetic West Bengal and Orissa. Widespread rain with a few heavy falls occurred in Orissa on 8th and in Gangetic West Bengal, East Pakistan and Assam from 6th to 11th June. Some noteworthy amounts of rainfall are:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
6	Phulbani	10	8	Goalpara	16
	Mohanbari	9		Pasighat	11
7	Balasore	8		Gauhati	7
	Puri	8	10	Silchar	15
	Phulbani	7		Shillong	14
	Angul	7		Haflong	13

Date	Station	Rainfall (cm)
10	Kailashahr	11
	Kohima	11
	Majdee	11
11	Imphal	11
	Haflong	10
	Silchar	10
	Cox's Bazar	8

The heavy rains in Assam were reported to have caused the Brahmaputra river to rise above the danger level and also heavy floods in Assam.

#### 5 Deep Depression in the Bay of Bengal—

—11th to 13th July 1962—

On the evening of 6th July an upper air cyclonic circulation extending to 3 km a.s.l. was lying over the northwest Bay of Bengal and neighbourhood. Pressure fall over coastal areas of central Burma and of East Pakistan indicated that a perturbation from the east was moving into northeast and east central Bay. By next morning the southeastern end of the axis of the monsoon trough on the sea level chart extended into northwest Bay and on the morning of 8th a low pressure area formed over the northwest Bay. The associated upper air cyclonic circulation extended upto 6 km a.s.l. On 9th morning the low pressure area over the northwest Bay became well marked. The well marked low pressure area extended into the west central Bay on 10th and by the morning of 11th, it rapidly concentrated into a deep depression centred at 0830 hrs IST near 17.5°N, 86.5°E. The following observations of 11th are of interest in this connection:

Name of the Ship	Position	Hour of Obsn. (IST)	Wind	Weather
S.S. Jalapratap	18.1N, 86.9E	0530	SSE/20kt	
S.S. Jalapratap	18.9N, 87.5E	1130	SE/30kt	Squally Weather
S.S. Jagamitra	19.1N, 86.2E	1130	ENE/10kt	

Log of S.S. Jalapratap showed that the wind veered from southwest to east-southeast from 0030 IST to 0530 IST of 11th and that pressure dropped steadily from 993 mb at 1730 IST of 10th to 984 mb at 0530 IST of 11th. The estimated central pressure of the deep depression was 982 mb and the pressure deficiency at the centre was about 18 mb.

The deep depression moved northwest and lay centred at 1730 IST of 11th near 18.5°N, 85.5°E. In the course of the night it crossed the south Orissa coast near Gopalpur and lay over south Orissa and adjoining Madhya Pradesh on the morning of 12th with centre at 0830 IST about 150 km westnorthwest of Gopalpur. Thereafter the deep depression weakened into a depression, moved westnorthwestwards across east Madhya Pradesh and lay at 0830 IST of 13th over west Madhya Pradesh with centre near Pachmarhi. By the same evening it weakened into a low pressure area over northwest Madhya Pradesh.



In association with the deep depression fairly widespread rain occurred in Orissa from 10th to 12th, in Madhya Pradesh from 11th to 13th and in coastal Andhra Pradesh on 12th.

#### 6 Depression in the Arabian Sea—

—8th to 15th July 1962—

On 4th July an upper air cyclonic circulation extending between 1.5 and 3.6 km a.s.l. developed over the east central Arabian Sea and the adjoining Konka coast. It shifted northwards gradually and lay over Saurashtra and Kutch on the evening of 6th. Under its influence a trough of low pressure developed over north east Arabian Sea and adjoining Saurashtra and Kutch on the morning of 7th. By the next morning a well marked low pressure area developed over Saurashtra and Kutch and the associated upper air cyclonic circulation extended to 6 km a.s.l. By 173 IST of 8th the well marked low pressure area over Saurashtra and Kutch concentrated into a depression centred close to Porbandar near  $21.5^{\circ}\text{N}$ . By next day morning the depression became deep and was centred near  $21.5^{\circ}\text{N}$ ,  $68.5^{\circ}\text{E}$  at 0830 IST of 9th. The estimated pressure deficiency at the centre was 11 mb. The upper air cyclonic circulation associated with the depression extended to 7 km a.s.l. It remained practically stationary over the northeast Arabian Sea during the next 24 hours. Thereafter, it shifted northeast into the Gulf of Kutch where it weakened slightly and was centred near  $22.5^{\circ}\text{N}$ ,  $69.5^{\circ}\text{E}$  at 1730 IST of 10th. The depression remained practically stationary over Saurashtra and Kutch and adjoining northeast Arabian Sea, with its centre near Dwarka, until the 13th.

Thereafter, the depression moved westwards and emerging into the northeast Arabian Sea it was centred near  $22.5^{\circ}\text{N}$ ,  $67.5^{\circ}\text{E}$  at 0830 IST of 14th. It moved further northnorthwestwards and at 1730 IST of 14th it was centred near  $23.5^{\circ}\text{N}$ ,  $67.0^{\circ}\text{E}$ . Continuing to move northwestwards, it lay centred near  $24.5^{\circ}\text{N}$ ,  $64.5^{\circ}\text{E}$  at 0830 IST of 15th. It moved further westwards and weakened into a low pressure area by the same evening.

In association with this system fairly widespread rain with scattered heavy falls occurred in north Konkan, Saurashtra and Kutch on several days during the period 8th to 14th July. Some of the noteworthy amounts of rainfall recorded were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
8	Veraval	16	13	Dahanu	16
12	Porbandar	29		Veraval	15
			14	Naliya	13

#### 7 Depression in the Bay of Bengal and Deep Depression in the Arabian Sea—

—8th to 14th September 1962—

On the morning of 5th September an upper air cyclonic circulation extending to 6.0 km a.s.l. lay over south Burma and adjoining Andaman Seas. The pressure departures over coastal Burma were of the order of 4-5 mb below normal. Under its influence a low pressure area formed over North Andaman Sea, on the morning of 6th with central region near  $14.0^{\circ}\text{N}$ ,  $95.0^{\circ}\text{E}$  and the associated upper air cyclonic cir-

culuation extended to 9.0 km a.s.l. By the morning of 7th the low pressure area shifted to east central Bay with central region near 15°N, 90°E. On 8th morning it concentrated into a depression which was centred at 0830 IST near 16.5°N, 85.5°E. In this connection the following observations of 8th are of interest:

Name of the S h i p	Position	Time of Obsn. (IST)	Wind	W e a t h e r
S.S.Bharat Mitra	17.0N, 84.2E	0530	NE/10kt	Slight cont. drizzle
"	17.2N, 84.5E	1020	NE/15kt	Heavy rain squalls
"	17.7N, 84.7E	1115	NE/20kt	Frequent rain squalls
S.S.Jalavikram	15.4N, 85.2E	1130	W/15kt	
S.S.Matra	15.2N, 86.2E	1000	WSW/10kt	

The depression moved westwards and was centred near 16.5°N, 83.5°E at 1730 IST of 8th.

Moving further westwards the depression crossed the north Andhra coast near Kakinada during the night of 8th-9th and was centred near Bhadrachalam Road at 0830 IST of 9th. Thereafter it moved rapidly westnorthwestwards and emerged into the northeast Arabian Sea with its centre close to Dwarka at 0830 IST of 11th. Then it recurved in a northnortheasterly direction and became deep by the same evening when it was centred at 1730 IST close to the Kathiawar coast between Dwar and Naliya. At 0830 IST of 12th the deep depression lay over Kutch and the adjoining areas of Saurashtra and north Arabian Sea with its centre close to Naliya. Then it moved in a northwesterly direction and was centred near 24°N, 67.5°E at 1730 IST of 13th. Thereafter it moved practically westwards and weakened rapidly into a depression which lay over northeast Arabian Sea off Mekran coast with its centre near 24°N, 66.5°E at 0830 IST of 14th. The depression was centred near 24°N, 65.5°E at 1730 IST of 14th as indicated by the following observations of 14

Name of the S h i p	Position	Time of Obsn. (IST)	Wind	W e a t h e r
S.S.Barpeta	24.6N, 65.8E	1730	E/20kt	
"GDGL"	23.5N, 65.5E	1730	NW/15kt	Moderate/inter- mittent drizzle

The depression weakened into a low pressure area by the next morning and merged into the seasonal low the same evening.

In association with the formation and movement of this disturbance abundant rainfall occurred in the Bay Islands and in the areas lying between the Circars and the Kathiawar coast. Exceptionally heavy falls were also reported from Saurashtra and Kutch and lower Sind. Some of the noteworthy amounts of rainfall recorded were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
7	Long Island	9	10	Dahanu	11
9	Gopalpur	13		Nasik	11
	Masulipatam	12		Baramati	11
	Kalingapatam	10	11	Veraval	22
10	Bombay	21		Raigarh	15
	(Santacruz)			Porbandar	13
	Raigarh	13		Naliya	10
				Dwarka	7

Karachi and Hyderabad (Sind) recorded exceptionally heavy falls of 13 cm and 25 cm respectively for the 24 hour period ending at 0830 IST of 13th.

#### 8 Deep Depression in the Bay of Bengal—

—16th to 21st September 1962—

An upper air cyclonic circulation extending to 4.5 km a.s.l. moved from the Gulf of Siam into the north Andaman Sea across Tennasserim on the morning of 11th. It gradually shifted northwestwards and lay over central Bay on the morning of 13th. By the morning of 15th the upper air cyclonic circulation shifted further westwards and extended to 7 km a.s.l. and by the same evening a well marked low pressure area formed over the central Bay. By the morning of 16th, the well marked low pressure area shifted west into west central Bay and concentrated into a depression with its centre at 0830 IST near 17.5°N, 86°E. In this connection the following ships' observations of 16th are of interest:

Name of the Ship	Position	Time of Obsn. (IST)	Wind	Weather
S.S. Jalapratap	20.0N, 88.0E	0530	ENE/15kt	
S.S. Jagmitra	17.3N, 86.5E	0530	S/10kt	Moderate intermittent rain

On the morning of 17th the depression over the west central Bay became deep and was centred at 0830 IST near 18.5°N, 85.5°E. The following observations of 17th are relevant in this connection:

Name of the Ship/Stn.	Position	Time of Obsn. (IST)	Wind	Weather
S.S. Jalakanta	16.5N, 83.5E	0530	W/45kt	Moderate cont. rain
S.S. Fatehabad	15.8N, 88.1E	0530	WSW/20kt	Moderate to heavy rain or drizzle
Puri		0830	E/5kt	Slight cont. drizzle
Gopalpur		0830	NNE/5kt	Rain in last hour
Calingapatnam		0830	NNW/5kt	Slight intermittent drizzle

The deep depression off the Orissa coast moved westnorthwestwards and lay with its centre close to coast near Gopalpur at 1730 IST of 17th. It crossed the Orissa coast near 19°N, during the course of the night and lay over south Orissa with centre at 0830 IST of 18th about 100 km northwest of Gopalpur. Moving westnorthwest it lay over west Madhya Pradesh with its centre near Pachmarhi at 0830 IST of 19th. Moving in a northwesterly direction the deep depression lay over southeast Rajasthan centred at 0830 IST of 20th about 50 km southeast of Jhalwar. Thereafter it moved northwards and lay over northeast Rajasthan and adjoining Punjab and Uttar Pradesh on the morning of 21st with centre at 0830 IST about 80 km east of Jaipur. Moving further northnortheastwards it lay over the south Punjab (centred between Delhi and Hissar at 1730 IST of 21st. Thereafter it weakened rapidly and merged with the seasonal low by the next morning.

In association with the formation and movement of the deep depression very heavy rainfall occurred in the Bay Islands, northern parts of the Peninsula, the central parts of the country, east Rajasthan, west Uttar Pradesh and the Punjab(I). Some of the noteworthy amounts of rainfall recorded were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
15	Mayabandar	10	20	Indore	17
17	Hyderabad(Hakimpet)	10		Khandwa	16
	Sultanpur	10	21	Ratlam	27
18	Chanda	13		Ambala	20
	Bidar	10		Nainital	18
19	Pachmarhi	23		Chandigarh	17
	Nagpur	18		Simla	16
	Khandwa	11	22	Nainital	19
	Betul	11			

According to press reports, the heavy rains caused flooding of the Musi river and affected about 40,000 people in the twin cities of Hyderabad and Secunderabad. Road, rail and air traffic were also disturbed. It has also been reported that the Narmada and other rivers in Madhya Pradesh, the Jamuna, Ravi and the Beas in the Punjab and Delhi areas rose in spate causing many breaches and inundations over vast areas. Many towns and villages in the Punjab(I) were seriously affected and the services of the army were mobilised for evacuating thousands of marooned people.

#### 9 Cyclonic Storm in the Bay of Bengal— 19th to 24th September 1962—

A tropical depression from the east was moving westnorthwestwards across Thailand on the 17th and it lay over central Burma on the morning of 19th. By the evening of the same day, it moved westwards into the north Bay across the Arakan coast and was centred at 1730 IST near 19.5°N, 92.0°E. The associated upper air cyclonic circulation extended to 7 km a.s.l. The departures of pressure from normal were of the order of 5-7 mb along the Arakan-Chittagong coasts. On the morning of 20th the depression lay over north Bay with its centre at 0830 IST near 21°N, 90°E.

By the evening of the same day negative pressure departures of the order of 6-8 mb and strengthening of upper winds in lower tropospheric levels over Chittagong and West Bengal coasts suggested that the depression over the north Bay had become deep and was centred at 1730 IST of 20th near 21.5°N, 89.5°E. Associated upper air cyclonic circulation extended to 9 km a.s.l.

Fairly widespread heavy rain over Gangetic West Bengal, negative pressure departures of the order of 10-13 mb over the coastal areas and strengthening of upper winds suggested that the deep depression over the north Bay of Bengal had further intensified into a cyclonic storm and was centred at 0530 IST of 21st close to the Sunderbans coast near  $89.5^{\circ}\text{E}$ , about 150 km southeast of Calcutta. At 0630 IST of 21st, S.S. Jagjamna, positioned near Sandheads, reported pressure 999.8 mb, wind westerly, force 48 knots, heavy continuous rain, swell 30 ft high and very rough seas. The estimated central pressure of the storm at 0530 IST was 990 mb and the pressure deficiency was 12 mb. The cyclonic storm moved northnorthwest, crossed the Sunderbans coast near  $89.5^{\circ}\text{E}$ , about 150 km southeast of Calcutta and was centred at 0830 IST of 21st about 50 km eastsoutheast of Calcutta.

Moving in a northwesterly direction, the cyclonic storm was centred near Naya Dumka at 0830 IST of 22nd. It weakened into a depression the same evening when it was centred at 1730 IST about 60 km eastnortheast of Hazaribagh. The depression moved northwestwards and lay over Bihar Plains and adjoining east Uttar Pradesh on the morning of 23rd, centred at 0830 IST near Gaya. It continued to move slowly northwest and lay at 0830 IST of 24th over east Uttar Pradesh with its centre between Dehri and Varanasi. By the 25th morning, it weakened and lay as a well marked low pressure area over east Uttar Pradesh and became unimportant on the 26th.

The estimated lowest central pressure during the entire life of the storm was 990 mb at 0530 IST of 21st and the pressure deficiency was 12 mb.

In association with the storm the monsoon was active in the States of West Bengal and Bihar and in east Uttar Pradesh from 21st onwards. Some of the noteworthy amounts of rainfall were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
22	Purulia	13	23	Daltonganj	39
	Contai	12		Sabour	19
	Midnapore	11	24	Chapra	11
	Calcutta	11	26	Bahraich	15

10 Deep Depression in the Bay of Bengal—  
—22nd to 26th October 1962—

The seasonal trough of low pressure over the south Bay of Bengal was well marked on the evening of 19th October, with upper air cyclonic circulation extending to 3 km a.s.l. On the morning of 20th a low pressure formed over the southwest Bay off Ceylon and the associated upper air cyclonic circulation extended upto 4 km a.s.l. The low pressure area persisted there, and fairly widespread rain with isolated heavy falls occurred over the east coast of Madras State and of Ceylon. By the morning of 22nd October, the low pressure area over the southwest Bay became well marked with associated cyclonic circulation extending to 6 km a.s.l. On the same evening the well marked low pressure area over the southwest Bay concentrated into a depression centred at 1730 IST near  $8.5^{\circ}\text{N}$ ,  $84.0^{\circ}\text{E}$ . The following ships' observations of 22nd are relevant in this connection:

Name of the Ship	Position	Time of Obsn. (IST)	Wind
S.S. State of Madras	$9.1^{\circ}\text{N}$ , $86.1^{\circ}\text{E}$	1730	SSE/15kt

Name of the S h i p	Position	Time of Obsn(IST)	W i n d
MV Julesburg	6.0N, 86.0E	1730	SSW/25kt
MV SS.Serenia	5.9N, 81.7E	1730	WSW/30kt
MV SS.Kibimaru	5.8N, 83.3E	1730	WSW/40kt

At 0530 IST of 23rd, S.S.State of Madras (9.3°N, 84.1°E) reported south southeasterly wind of 25 kt. This suggested that the depression had moved north-west and intensified further into a deep depression. The deep depression lay centred at 0830 IST of 23rd near 9.5°N, 83.5°E. Then it moved rapidly northwards and was centred at 1730 IST of 23rd near 12.5°N, 83.5°E as indicated by the following observations of 23rd:

Name of the S h i p	Position	Time of Obsn(IST)	Wind	W e a t h e r
S.S.Missicipi	14.7N, 82.2E	1730	NE/20kt	Shower in last hour
S.S.Jog Ganga	15.4N, 82.8E	1730	NE/30kt	
S.S.State of Madras	10.5N, 82.2E	1730	W/25kt	

Thereafter, moving slowly northwards the deep depression lay over west central and the adjoining southwest Bay on the morning of 24th with its centre at 0830 IST near 14°N, 83.5°E. During the next 24 hours the deep depression showed very little movement and at 0830 IST of 25th it was centred near 14.5°N, 83.5°E, where it remained practically stationary for a day but weakened into a depression by the morning of 26th. Thereafter, it moved westwards and lay close to Coromanda coast near Nellore at 1730 IST of 26th. It crossed the coast near Nellore on the night of 26th-27th and rapidly weakened into a low pressure area which lay over Rayalaseema and adjoining south Interior Mysore on the morning of 27th. The low pressure area moved westwards and by the evening of 28th it emerged into the east central Arabian Sea where it persisted for a few days.

The lowest estimated central pressure of the deep depression during its life history was 1000 mb at 0530 IST of 24th, when the pressure deficiency at the centre was about 10 mb.

In association with the disturbance the coastal area of Madras State and Andhra Pradesh received very heavy rain. Some of the heavy falls reported were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
22	Nellore	8	25	Kalingapatnam	26
23	Madras	14		Visakhapatnam	13
	Nellore	7	26	Gopalpur	18
24	Kalingapatnam	17		Kakinada	23
	Nellore	15		Puri	11
	Visakhapatnam	7			

According to press reports, the heavy rains inundated low lying areas of Visakhapatnam.

11 Severe Cyclonic Storm in the Bay of Bengal—  
—26th to 30th October 1962—

On the morning of 25th, a tropical depression was located in the Gulf of Siam centred at 0530 IST near 8°N, 105°E. Moving westwards it was probably crossing north Malayasia and adjoining Tennasserim on the morning of 26th. At 0830 IST of 26th Victoria Point recorded 4 cm of rain and a pressure fall of 2 mb. during the preceding 24 hours, the departure of pressure from the normal being -4 mb. By the same evening the depression emerged into the Andaman Sea and the adjoining southeast Bay as indicated by the pressure fall over the Bay Islands and pressure rise along the Tennasserim coast. Ships' observations over the Andaman Sea were absent but the backing and strengthening of upper winds over Port Blair at lower tropospheric levels suggested that the depression was centred at 1730 IST of 26th within a degree of 10.5°N, 93°E. Associated upper air cyclonic circulation extended to 5.4 km a.s.l. On the morning of 27th the veering of upper winds over Port Blair in lower levels suggested that the depression over the southeast Bay moved westnorthwest and was centred at 0830 IST of 27th near 11°N, 91°E. The depression over southeast Bay moved westnorthwestwards, deepened and was centred at 0830 IST of 28th near 13.0°N, 85.5°E. In this connection the following observations of 28th are of interest:

Name of the S h i p	Position	Time of Obsn.(IST)	Wind	Weather
S.S.Kayan	12.7N, 84.8E	0530	NNW/25kt	Moderate cont. rain
S.S.Amstelmolen	12.0N, 85.0E	1130	SW/20kt	

Moving further northwestwards the deep depression lay over the west central and the adjoining southwest Bay at 1730 IST of 28th with its centre near 14.0°N, 84.5°E. Associated upper air cyclonic circulation extended upto 6 km a.s

Thereafter, the deep depression moved northnorthwest and intensified in a cyclonic storm which was centred at 0830 IST of 29th near 16°N, 84°E. Upper winds over Visakhapatnam strengthened considerably. In this connection the following observations of 29th are significant:

Name of the Ship/Stn.	Position	Time of Obsn.(IST)	Wind	W e a t h e r/ R e m a r k s
S.S.Kayan	15.0N, 83.5E	0830	WNW/37kt	Height of wave 4½ to 5 metres. Phenomenal shower in last hour
S.S.Spring Valley	15.1N, 82.3E	1030	N/35kt	Heavy cont. rain. Rough seas and heavy northerly swell
Visakhapatnam		0830	040/25kt	Slight cont. rain

The cyclonic storm recurved northnortheastwards and was centred at 1730 IST of 29th near 17.5°N, 84.5°E.

The cyclonic storm moved rapidly northeastwards into northwest Bay. During the 24 hour period ending with 0830 IST of 30th the pressure fall at Sandhead was 10 mb, the pressure departure from normal was over 14 mb and the rainfall recorded was 18 cm. All these suggested that the cyclonic storm over the northwest Bay intensified into a severe cyclonic storm centred at 0830 IST of 30th near 20° 88°E. The following observations of 30th are significant in this connection:

Name of the Ship/Stn.	Position	Time of Obsn. (IST)	Wind	Weather
S.S. Jalapalak	20N, 87.7E	0930	N/50kt	
S.S. King Malcom	20N, 89.6E	0530	S/20kt	Rain shower
S.S. Jalamudu	19.3N, 87.5E	0530	SSW/30kt	
Sandheads		0830	ESE/30kt	Rain shower

The severe cyclonic storm over the northwest Bay continued to move northeastwards and was centred at 1730 IST of 30th close to the Chittagong coast near 22°N, 91°E.

Northwesterly wind of Cox's Bazar at 2330 IST of 30th suggested that it crossed coast near Chittagong by about midnight of 30th. It weakened rapidly and broke up against the hills of lower Assam and adjoining upper Burma by the morning of 31st.

The estimated lowest central pressure during the life of the severe cyclonic storm was 990 mb at 1330 IST of 30th and the corresponding pressure deficiency was 16 mb. Due to lack of observations the track of the system could be stated from 1730 IST of 26th only.

Under the influence of the storm fairly widespread rain occurred in the Bay Islands, coastal Andhra Pradesh, Orissa, Gangetic West Bengal, East Pakistan and lower Assam. Some of the heavy falls reported were:

Date	Station	Rainfall (cm)	Date	Station	Rainfall (cm)
30	Barisal	18	30	Chittagong	9
	Majdee	17		Balasore	8
	Sandheads	17		Cuttack	8
	Puri	15			
	Gopalpur	12	31	Majdee	14
	Kalingapatam	12		Comilla	10
	Chandbali	11		Barisal	9
	Cox's Bazar	10		Imphal	8

12 Severe Cyclonic Storm in the Bay of Bengal—  
—26th to 29th November 1962—

On the morning of 26th, a depression from the east moved westwards into the south Andaman Sea centred at 0830 IST near 7.5°N, 96.5°E. Moving further westwards, the depression was centred near 7.5°N, 94°E at 1730 IST of 26th. During the night of 26th the depression moved northwest and concentrated into a deep depression which was centred at 0830 IST of 27th near 8.5°N, 90.5°E as indicated by the strengthening of upper winds over Port Blair and the following ships' observations of 27th.



Name of the S h i p	Position	Time of Obsn. (IST)	Wind	Weather
M.V.State of Assam	10.6N, 91.4E	0530	E/30kt	
M.V.Andaman	9.9N, 90.3E	0530	ENE/25kt	Slight cont.rain

Associated upper air cyclonic circulation extended to 4.5 km a.s.l.

The deep depression continued to move northwest and intensified into a cyclonic storm with centre at 1130 IST of 27th near 9.5°N, 89.5°E. Maintaining its northwesterly course the cyclonic storm became severe with a core of hurricane winds during the course of the evening and early night of 27th when it was centred near 10.0°N, 88.5°E as evidenced by the following observations recorded by M.V. Andamans which passed near the storm centre. The estimated lowest pressure at the centre of the severe cyclonic storm on that evening was 974 mb and the pressure deficiency was about 34 mb. This was the lowest value estimated during the life history of the storm.

Table showing 3 hourly/hour observations recorded by M.V.Andamans dated 27.11.1962.

Hour of Obsn.(IST)	Position	Bar reading corrected	Wind	W e a t h e r
1430	10.4N, 88.8E	996.0	050/44kt	Moderate cont. rain
1730	10.6N, 88.3E	975.8	Var/13kt	Heavy cont. rain
1830	10.5N, 88.3E	975.3	040/24kt	Heavy cont. rain
1930	10.4N, 88.2E	976.3	350/35kt	Heavy cont. rain
2030	10.3N, 88.2E	981.3	200/76kt	Heavy cont. rain
2130	10.3N, 88.2E	996.0	220/52kt	Heavy cont. rain
2330	10.8N, 87.4E	1005.4	260/20kt	Slight cont. rain

S.S.Orlik reported on 27th that the eye of the cyclone was about 20 miles in diameter and that according to the Captain's observation the cyclone was moving about 25 miles per hour.

The severe cyclonic storm with the core of hurricane winds continued to move northwest and was centred at 0830 IST of 28th near 12°N, 87°E.

It then moved rather rapidly westnorthwestwards and lay over west central Bay on the morning of 29th with centre at 0830 IST near 14°N, 81.5°E. Thereafter, the severe cyclonic storm maintaining its westnorthwesterly course weakened into a cyclonic storm by 1730 IST of 29th when it was centred close to south Andhra coast near 14.5°N, 80.5°E. It then weakened further into a deep depression, crossed the south Andhra coast near Nellore during the night of 29th-30th. Thereafter it rapidly weakened into a low pressure area by the morning of 30th and became unimportant later.

The storm did not give much of rain.

13 Severe Cyclonic Storm in the Bay of Bengal—  
—9th to 13th December 1962—

On the morning of 6th December the seasonal trough over the Bay of Bengal became active and a low pressure area appeared over the southeast Bay and on the morning of 7th, an upper air cyclonic circulation developed over southeast Bay and the Andaman Sea between 1.5 and 4.5 km a.s.l. Pressure fell by 2-3 mb over the region extending from Ceylon to Tennasserim coast. By the next morning the low pressure area over the southeast Bay became more marked and heavy rain occurred in the south Bay Islands. Car Nicobar reported 10 cm and Nancowrie 9 cm of rain. On the morning of 9th, occurrence of fairly widespread rain over the Bay Islands and the strengthening of upper winds over Port Blair particularly between 1.5 and 4.5 km a.s.l. indicated that the low pressure area over the southeast Bay had become well marked. Associated upper air cyclonic circulation extended upto 4.5 km a.s.l. In the course of that day, the well marked low pressure area concentrated into a depression which was centred at 1730 IST of 9th near 10°N, 89.5°E. The following observations of 9th are relevant in this connection:

Name of the Ship/Stn.	Position	Time of Obsn. (IST)	Wind	Weather
S.S.State of Gujarat	11.8N, 90.1E	1730	E/05kt	
S.S.Mozaffari	7.5N, 90.4E	1730	WSW/20kt	
Port Blair		1730	E/15kt	Mod. cont. rain
Car Nicobar		1730	S/03kt	Slight intermittent drizzle

By the morning of 10th the depression moved north, deepened and was centred near 10.5°N, 89.5°E at 0830 IST. In this connection the following observations of 10th are of interest:

Name of the Ship/Stn.	Position	Time of Obsn. (IST)	Wind	Weather
M.V.Andamans	11.1N, 86.0E	0830	N/20kt	
Port Blair		0830	E/20kt	Slight intermittent drizzle
Car Nicobar		0830	SW/02kt	

In the course of the day, the deep depression intensified into a severe cyclonic storm and moved northeastwards and was centred at 1730 IST of 10th near 11°N, 90°E. At 1130 IST of 10th, S.S.Reinsels (DLCN), (position 11.44°N, 90.15°E) reported wind increasing, force 11/12, visibility 1/2 mile, heavy rain shower, very rough sea, bar 745 mm (993.2 mb) and at 1730 IST the same ship at 12.0°N, 90.2°E reported easterly wind of 50 kt and pressure 999.0 mb.

The severe cyclonic storm remained practically stationary on the morning of 11th. It then moved eastwards and weakened into a cyclonic storm centred at

0830 IST of 12th near 11°N, 92.5°E as indicated by the following observation of 12th:

Name of the Ship/Stn.	Position	Time of Obsn. (IST)	Wind	Weather
M.V. Andamans	10.0N, 92.6E	0830	SW/30kt	
Port Blair		0830	ENE/20kt	Moderate cont. rain
Mayabandar		0830	E/30kt	

Port Blair recorded 26 cm and Long Island 9 cm of rain on the morning of 12th. Moving further eastwards, the cyclonic storm lay centred near 11°N, 93.5°E at 1730 IST of 12th.

On 13th mornig there was a general rise of pressure since 1730 IST of 12th the highest being 3.4 mb (corrected for diurnal variation) over Port Blair. The cyclonic storm moved further eastwards, waekened into a depression and lay at 0830 IST of 13th over the Andaman Sea, centred near 11°N, 94.5°E. By 1730 IST of 13th, the depression in the Andaman Sea weakened further into a well marked low pressure area and became unimportant by 15th.

The lowest estimated central pressure during the life time of the severe cyclonic storm was 990 mb at 1730 IST of 10th and pressure deficiency was 19 mb.

In association with this disturbance heavy rains occurred in the Bay Islands on most of the days during the period 8th to 13th December. Port Blair recorded an exreptionally heavy fall of 26 cm on 12th. The other noteworthy amounts of rainfall were:

Date	Station	Rainfall (cm)
8	Car Nicobar	10
	Nancowrie	9
10	Mayabandar	12
	Port Blair	8
	Nancowrie	8
	Car Nicobar	7
12	Long Island	9.

Table II

Monthly distribution of Cyclonic Storms and Depressions  
in the Bay of Bengal and Arabian Sea 1962

Month	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Total	
Distur- bance	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C
Bay of Bengal	-	-	-	-	-	-	-	-	1	1	1	-	1	-	-	-	2	1	1	1 (1)	-	1 (1)	-	1 (1)	6	5 (3)
Arabian Sea	-	-	-	-	-	-	-	-	2	-	-	-	1	-	-	-	1	-	-	-	-	-	-	-	4	-
Total	-	-	-	-	-	-	-	-	3	1	1	-	2	-	-	-	3	1	1	1 (1)	-	1 (1)	-	1 (1)	10	5 (3)

D = Depression

C = Cyclonic Storm

Figures in bracket indicate  
Severe Cyclonic Storm

# TRACKS OF STORMS AND DEPRESSIONS

(IN THE INDIAN SEAS)

1962

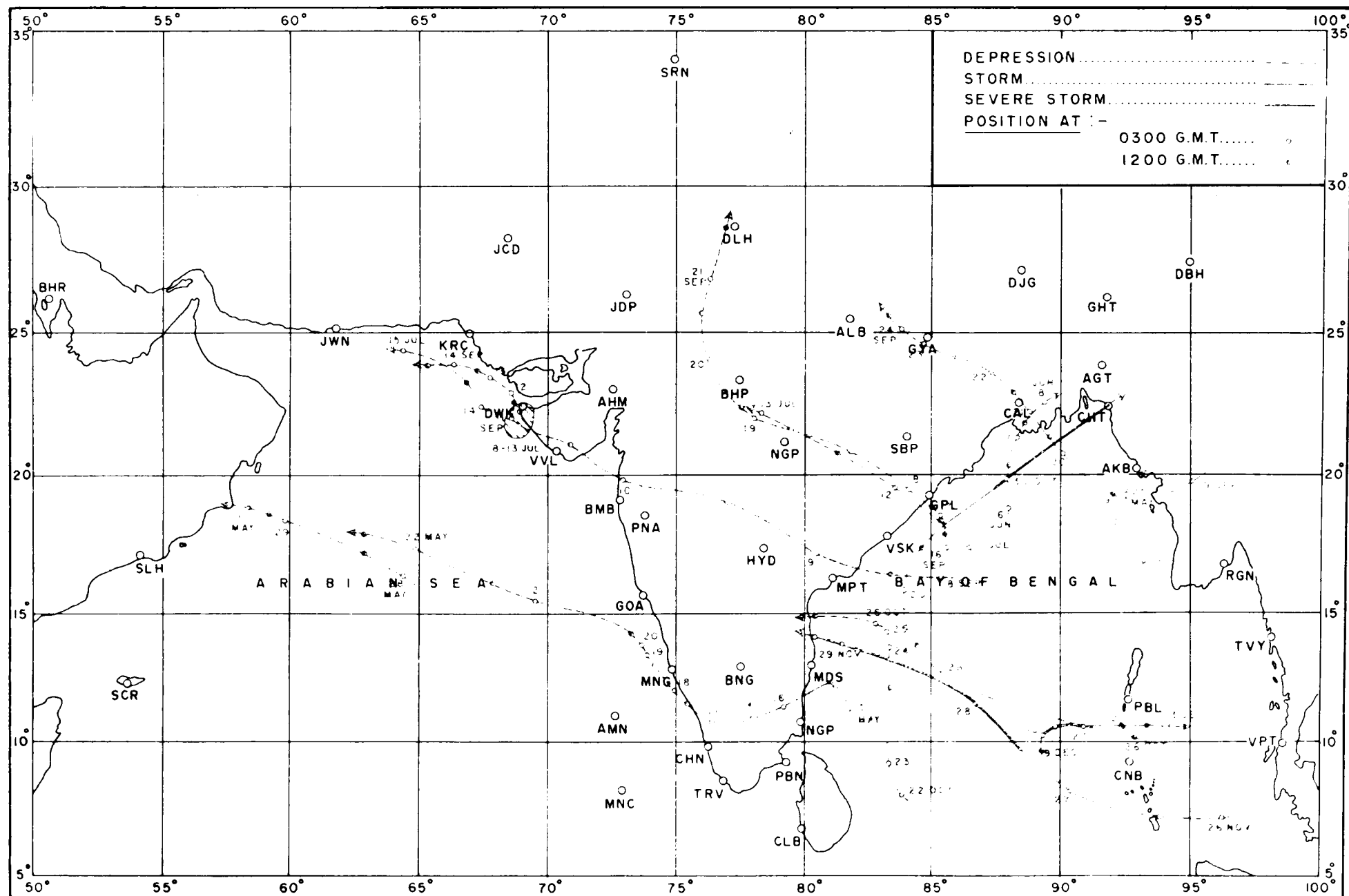


FIG. 1